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Process for immobilization of nucleic acid molecules on a substrate

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Claims

1. Process for immobilization of nucleic acid molecules on a substrate wherein the substrate is treated with atomic oxygen plasma prior to immobilizing the nucleic acid molecules thereon.
2. Process according to claim 1, characterized in that the nucleic acid is selected from the group comprising DNA, RNA, PNA, CNA, RNA, HNA, p-RNA, oligonucleotides, oligonucleotides of DNA, oligonucleotides of RNA, primers, A-DNA, B-DNA, Z-DNA, polynucleotides of DNA, polynucleotides of RNA, T-junctions of nucleic acids, domains of non-nucleic acid polymer-nucleic acid blockcopolymers and combinations thereof.
3. Process according to claim 1 or 2, characterized in that the nucleic acid is double-stranded or single-stranded.
4. Process according to any of the preceding claims, characterized in that the nucleic acid is of natural character, modified, such as substituted with functional groups, non-modified or artificially generated.
5. Process according to any of the preceding claims, characterized in that the substrate is a single crystal surface or an amorphous surface.
6. Process according to claim 5, characterized in that the surface material is selected from the group comprising silicon oxides, glass, aluminum oxides, sapphire, perovskites, like  $\text{SrTiO}_3$ ,  $\text{LaAlO}_3$ ,  $\text{NdGaO}_3$ ,  $\text{ZrO}_2$  and derivatives thereof and stabilized and/or doped derivatives thereof.

7. Process according to any of the preceding claims, characterized in that microwave generated oxygen plasma producing atomic oxygen or a mixture of gases containing oxygen is used.
8. Process according to any of the claims 1 to 6, characterized in that high-voltage generated and/or UV-light emitting source generated oxygen plasma producing atomic oxygen or a mixture of gases containing oxygen is used.
9. Process according to any of the preceding claims, characterized in that the substrate is treated with atomic oxygen plasma for about 0.1 to 10 minutes.
10. Process according to any of the preceding claims, characterized in that the atomic oxygen plasma treatment is carried out using an oxygen pressure in the range of about 0.1 to 1.0 mbar, preferably 0.2 to 0.8 mbar.
11. Process according to any of the preceding claims, characterized in that the nucleic acid to be immobilized on the substrate is present in an aqueous solution.
12. Process according to claim 11, characterized in that the substrate is treated with the nucleic acid containing an aqueous solution, at least for a few seconds up to about 5 minutes, preferably 1 to 2 minutes.
13. Immobilized nucleic acid obtainable by a process according to any of claims 1 to 12.
14. Use of the immobilized nucleic acid according to claim 13 in nucleic acid based nanotechnology, such as nanoelectronics, like wires, biosensors, chips and the like.